Instruction Book for Ward's Airline Conqueror Radio Receiving Set

ESTABLISHED 1872

The Oldest Mail Order House Is Today the Most Progressive

Montgomery Ward & Co.

Satisfaction Guaranteed or Your Money Back

CHICAGO KANSAS CITY ST. PAUL BALTIMORE
PORTLAND, ORE. OAKLAND, CALIF. FORT WORTH

91-62-90A

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Your Airline Is Easy To Install

The final test which every Airline Radio must meet is that it must be easy to install and operate. We have purposely made this book as simple as possible. The information and friendly advice in this book has been prepared for your benefit with the hope that you will find it useful and helpful.

30 Day Trial

This Radio Set is guaranteed against any defects in materials and workmanship. Before we sent it we thoroughly inspected it to make sure it was in perfect condition.

It is part of our policy of fairness to permit you to try this radio in your own home. If the radio does not operate properly (as well as other radios in your neighborhood) you may return the set providing you write us of your intentions within 30 days from the time you received the set. If you write us about the trouble, our Radio Service Department will usually be able to tell you how to correct it. A radio set cannot be returned after the 30-day trial period is over. If you like the set, but are having some difficulty, do not return the set, but write us for an extension of the 30-day trial period.

It Case Of Trouble

On rare occasions, a very minor difficulty (caused by rough handling during shipment) may prevent the set from operating perfectly. If this should happen you probably will locate the trouble, by reading this instruction book carefully, particularly pages 18 and 19. If you still are unable to make the radio work properly, read the inside of the back cover headed "If You Have Any Difficulty".

Use it for Pleasure and Profit

Do not look upon your Airline Radio as a luxury but rather as a splendid investment for all the family. Use your Airline to keep in touch with the latest market reports. Protect your crops by listening to the weather reports which are broadcast each day—profit by the advance storm warnings—make your Airline a source of profit as well as a means of entertainment.

KEEP THIS BOOK FOR FUTURE REFERENCE

Your new Airline Radio will be a source of pride and pleasure to you. You will be delighted with its handsome appearance and beautiful tone quality. Whichever model you have, you will find it easy to connect and operate your new Airline Radio. This picture shows the Loud Speaker Model but the instructions apply for all models.

We know you are anxious to hear it and we tell you in the following pages the quickest and easiest way to install the set properly. Even though you are familiar with radio, we recommend that you read every word in this book. Follow the directions carefully and the Airline Radio will furnish you and your family with wonderful radio programs.

When choosing the location for your Airline Radio, do not place the set or the batteries too near to a hot stove or radiator.

The Importance of a Good Antenna

The importance of a good Antenna can not be overestimated. All of your future enjoyment of your Radio Set depends upon the ability of your antenna to receive the radio programs and lead them to the radio instruments.

Take a little extra care and put up a properly erected, efficient antenna—you will be well repaid for your extra time and effort because you will get so much extra pleasure and so much better results from your radio set.

This package contains everything necessary to put up the best antenna it is possible to erect. Be sure to unwrap all papers and check the contents of this package with this list. The package contains:

Bare copper wire (125 feet)	1 roll
Covered connecting wire (30 feet)	1 roll
Porcelain insulators	2
"Stand-off" insulators	4
"Storm King" lightning arrester	1
Ground clamp	1
Envelope containing:	
12-inch piece of tubing	1
Screw eyes	2
Screws for lightning arrester	2
Connector	1

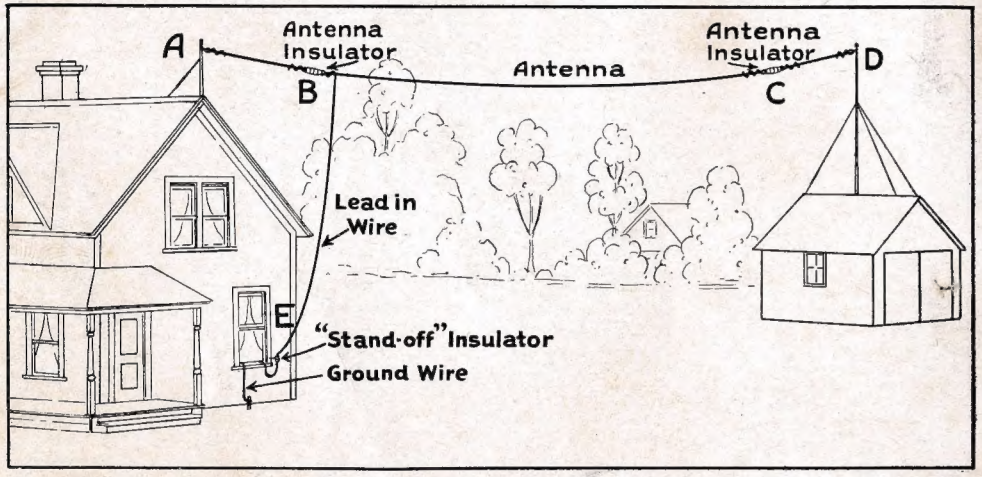


Fig. 1—This shows a properly erected, efficient antenna. It is one continuous piece of bare copper wire from C to B to E. Make the lengths of the wires A to B and C to D to suit your local conditions.

The Best Location for the Radio Set and the Antenna

Before you start to erect the antenna, decide where you are going to place the radio set in your home. Choose a location where the lead-in wire (see Fig. 1), will be as short and direct as possible. Also, keep in mind that the ground wire (the wire which connects radio set to a water pipe or to moist ground) should be as short as possible.

The antenna should be erected over open ground and should be clear of all trees, branches or buildings. For best results, it should be at least 25 feet above the ground. If it runs over the top of a building, it should be at least 6 feet above the roof. Try to plan so the near end of the antenna will be directly over the place where you are going to keep your radio set. The far end of the antenna should be as high, or higher, than the end of the antenna near the radio set.

The antenna may be supported between any two convenient supports such as house and garage, house and barn, tree or windmill tower.

The best average length of the antenna and lead-in combined (the distance from C to B to E, Fig. 1.) is about 100 feet. This is one continuous piece of bare copper wire without joints.

The proper length of the antenna depends upon several conditions. If you are near a powerful broadcasting station, you may have trouble in tuning-out this near-by station if you use an antenna 100 feet long. The best plan is to erect a 100-foot antenna and, after you have tried your set for several days, reduce the length of your antenna if necessary. If you find it necessary to shorten your antenna, move the antenna insulator C closer to the point B. Where the lead-in (B to E) is extra long, make the antenna (B to C) correspondingly shorter.

Never erect an antenna where it will cross electric power wires, either above or below them, and do not attach the antenna to the towers which support such wires. Try to keep the antenna away from telephone or electric light wires. If you cannot avoid being near telephone or electric light wires, build your antenna at an angle to them, but never parallel.

This Is the Easy Way to Erect the Antenna

Refer to Fig. 1 which gives a good idea how the antenna will look when erected. Unroll enough of the bare copper wire to reach from C to B and let it lie flat on the ground. Be very careful to avoid kinking the wire when unrolling it.

Now slip one of the antenna insulators on the wire until it comes directly under the point B. Place this insulator so the lead-in wire from B to E will swing clear of the house and eaves even when swayed by the wind. Now hold the bare copper wire and give the antenna insulator two or three twists so the wire will coil about itself as shown in Fig. 2.

From the other end of the coil of copper wire, cut off a piece long enough to reach from A to B. Make this wire long enough so the lead-in wire will swing clear of the building. Attach this wire to the other hole in the antenna insulator B and fasten the other end to the support on the house at A. Now attach the second antenna insulator to the end of the wire at C. Attach another short piece of wire in the other hole of insulator C, pull the antenna wire moderately tight and

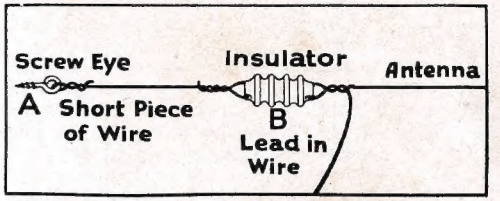


Fig. 2—This shows how the insulator B is fastened to the continuous piece of bare copper wire which forms the antenna and lead-in wire.

fasten the short wire to the support at D. The distance from C to D should not be less than 3 feet and if your supports A and D are very far apart, it may be necessary to use a long piece of strong wire to fasten the insulator C to the support D.

When using a tree for the far end support, make the distance C to D long enough so the insulator C will swing clear of all branches. Also, it is a good plan to put a small spring like a screen door spring between C and D so the swaying of the tree will not snap the antenna wire.

Bringing the Lead-in Wire into the House

Now screw one of the "stand-off" insulators into the frame of the window where the lead-in wire is to enter the house as shown at E Fig. 1.

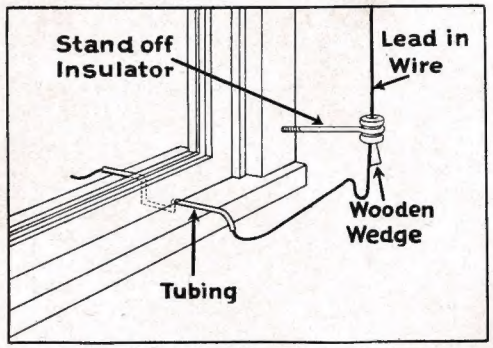


Fig. 3—Showing how the lead-in wire is brought into the house. If more convenient, the wire can be taken in over the top of the window.

Thread the wire through the hole in the stand-off insulator, pull the lead-in wire moderately tight and drive a small wooden wedge in the lower side of the stand-off insulator to hold the lead-in wire tight (see Fig. 3).

Now bend a small loop in the wire between the stand-off insulator and the window sill so the moisture coming down the wire will drip on the ground instead of following the wire down to the window sill. Slip the piece of tubing on the wire and place it so it comes directly under the window at one side. Close the window on the tubing and it will hold the wire securely.

Sometimes it is impossible to let the lead-in wire swing directly from B to E as shown in Fig. 1 and to meet this condition three additional stand-off insulators are furnished. If it is necessary to use these extra insulators, arrange them as shown in Fig. 4 so they will keep the lead-in wire at least six inches away from the eave troughs and the sides of the building. Put the extra insulators in place and thread the lead-in wire through them and then down to the stand-off insulator at E. Then proceed as described in the preceding paragraph.

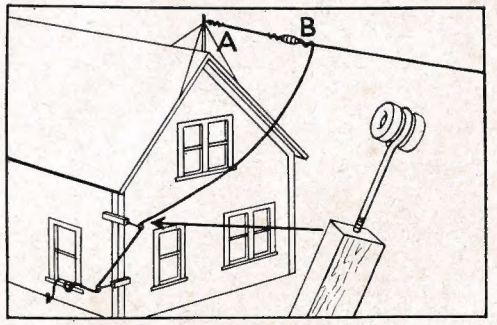


Fig. 4—When it is impossible to let the lead-in wire swing clear of the building, use the extra stand-off insulators to keep it away from the eave troughs and sides of the building.

Now Connect the Lightning Arrester

The lightning arrester furnished with this equipment is the same as used by most railways to protect their telegraph lines. It will provide full protection for your radio set in case of a lightning storm. Fasten the lightning arrester to the wall or baseboard near the window where the lead-in wire enters the house (see Fig. 5). Now cut off the end of the lead-in wire just inside the window and attach the small connector. Cut a piece of the covered connecting wire long enough to reach from the connector to the radio set. Remove the insulation for about ½-inch at one end and scrape the wire bright and clean. Insert the end of this wire in the connector and fasten it securely. Now run the wire up to the top binding post of the lightning arrester, carefully cut the insulation and remove about one inch of it. Do not cut the wire itself but simply lay bare about an inch of it, scrape it bright and clean and then wind it around the top binding post of the lightning arrester and screw the binding post nut down tight. Continue this wire to the binding post marked "Antenna" or "Ant" on the radio set, remove about 1 inch of the insulation, scrape the wire bright and clean and attach it firmly to the binding post.

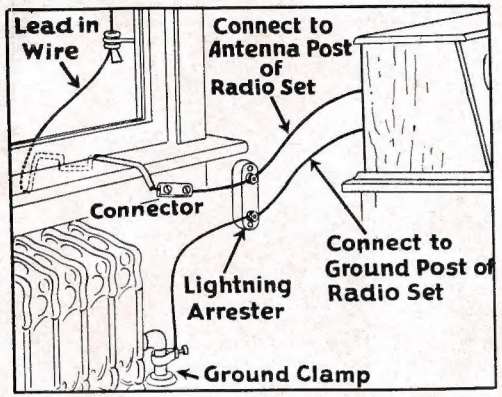


Fig. 5—Fasten the lightning arrester inside the window and connect the lead-in and ground wires as explained in the instructions.

How to Make a Good Ground Connection

A good ground connection for your radio set is fully as important as a good antenna. The purpose of the ground connection is to make contact with moist ground as near the radio set as possible. If you have running water in your home, you can connect the ground wire to the water pipe if it is near the radio set. If a steam or hot water radiator is closer, you may connect the ground wire to it provided the boiler is connected to the water system.

If no water or steam pipes are available for connecting the ground wire, you can drive a piece of *galvanized* pipe at least five or six feet into the ground just outside the window near your radio set. Try to select a place where the ground is moist to be sure of making a good contact. If you have an earth floor in your basement the pipe may be driven in the basement if that is more convenient.

Take another piece of the covered connecting wire, remove about 1 inch of the insulation at the end, scrape the wire bright and clean and attach it to the binding post marked "Ground" or "Gnd" on the radio set. Now run this wire to the lower binding post of the lightning arrester, remove about 1 inch of the insulation without cutting the wire and attach it securely to the lower binding post of the lightning arrester. Continue this wire to the water pipe or pipe you have driven into the ground.

The Adjustable Ground Clamp

The ground clamp furnished is adjustable and will fit the standard sizes of pipe found in the home. Clean the pipe where the clamp is to be attached and wrap the copper strip of the clamp around the pipe and draw it as tight as possible. Insert the two small lugs in the proper slots and bend the lugs over. With a screw driver, tighten the screw as tight as you can being sure that the point of the screw goes down into the side of the pipe. Now remove the insulation from the end of the ground wire, wrap it under the lock nut of the ground clamp and screw the nut down firmly.

It is a good plan to try several different ground connections to see which gives the best results. Try the different connections separately and use the one which gives the loudest, clearest tones.

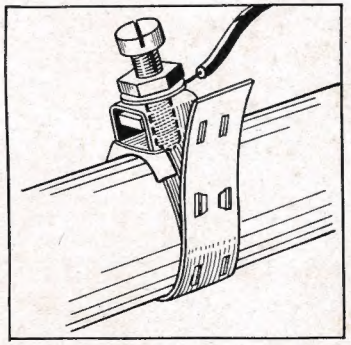


Fig. 6—This ground clamp is adjustable and insures a good, firm contact for the ground wire.

Connect Antenna and Ground to the Radio Set

The Antenna and Ground terminals are located on the right end of the sub-panel near the back.

Remember that the wire from the top binding post of the lightning arrester connects to the Antenna binding post and the wire from the lower binding post of the lightning arrester connects to the Ground binding post.

If you have a long antenna, connect to the binding post marked "Long Ant." If you have a short antenna, connect to the binding post marked "Short Ant." After you have your set in operation, it is a good plan to connect to first one and then to other of these binding posts and leave the wire connected where you get the best results. **For greater selectivity use the "Short Ant." binding post.**

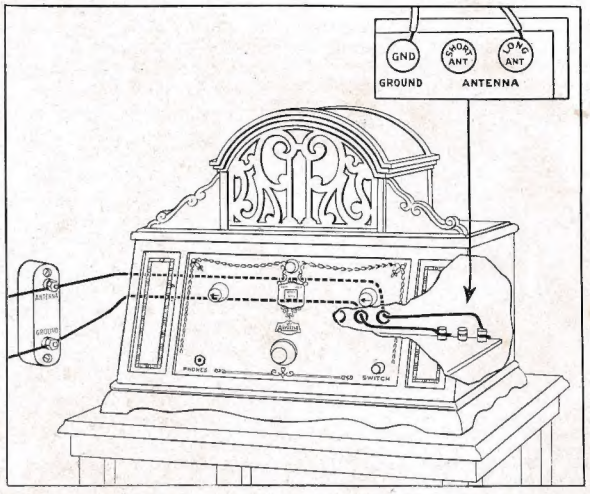


Fig. 7—Connect the wires leading from the Antenna and Ground to the Antenna and Ground Terminals of the radio set.

Now Place the Tubes in the Sockets

In the box of accessories you will find a special carton containing your six vacuum tubes. These tubes are quite delicate and **should always be handled very carefully.** If you damage your tubes by rough or careless handling, you cannot expect your set to operate satisfactorily.

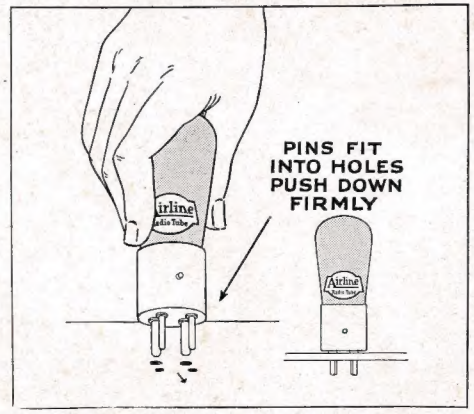


Fig. 8—This shows the correct method of placing the vacuum tubes in the sockets of the radio set.

Concealed type sockets are used in this Airline set. On the sub-panel of the set you will find five groups of four holes with a small arrow between the two smaller holes of each group. To place the tubes in the sockets, turn the tube until the small pin on the base of the tube points in the direction of the arrow, fit the prongs on the base of the tube into the four holes and then push down firmly until the tube holds securely.

In the High Boy Model, the radio set is arranged so that it can be pulled out like a drawer from the front of the cabinet. To place tubes in sockets, take out the back of the cabinet, remove the two red screws from the wood base that hold the radio instrument, then pull it forward.

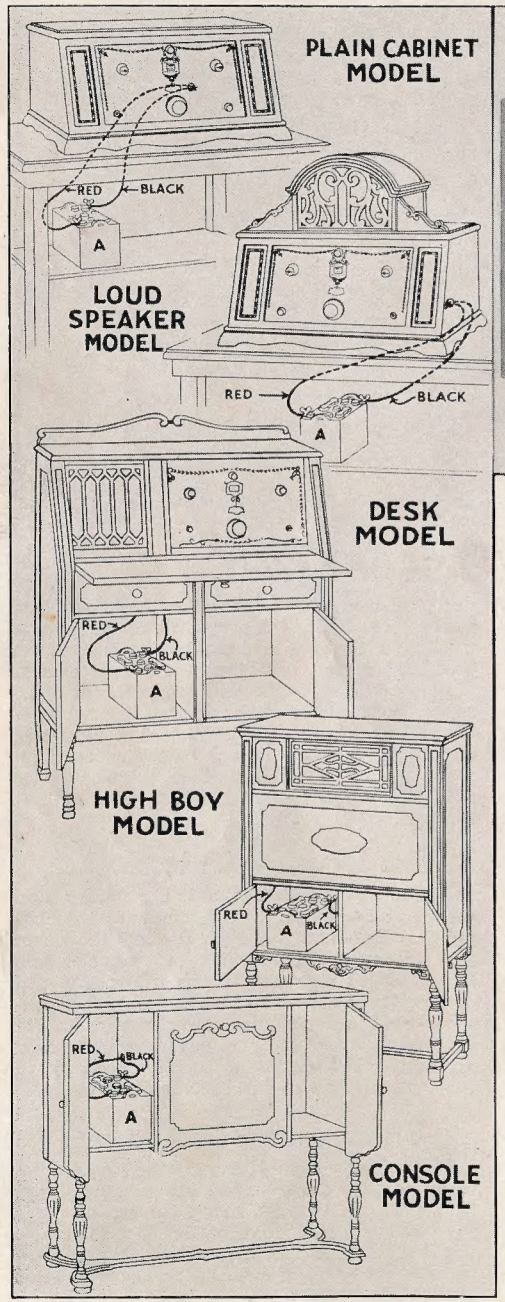
The Detector Tube Socket

The detector tube socket is the small round socket at the left toward the rear of the sub-panel. When you put the tube in this socket you will notice that the socket is loose and flexible. This is the special, loose, spring suspended detector tube socket and is made this way purposely to prevent noises in your radio set caused by vibrations or sounds in the room near your set. Put the detector tube in the socket in the same manner as you did the other tubes.

The Battery Connections

To avoid any possible damage to your vacuum tubes, **always connect the storage "A" battery first.** If through error, the red or black wire is connected to the "B" batteries, the vacuum tubes will be instantly destroyed **and burned out tubes cannot be returned for credit or be replaced.**

Connect the Storage "A" Battery First



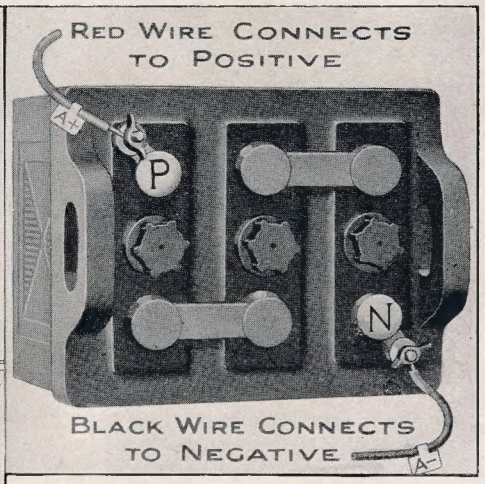


Fig. 9—Place the Storage "A" Battery on the shelf under the table. This shows the top view.

Uncrate the storage "A" battery and wipe the outside with a cloth dampened with ammonia or baking soda and water to remove acid stains. (See complete instructions for the care of the storage battery on Page 13.)

Place the battery on the shelf under the table, on the floor near the radio set or in the lower compartment of the cabinet as shown in the pictures at the left. Put a sheet of heavy cardboard under the battery to prevent any possible damage from acid. Before connecting the wires to the battery, grease the battery terminals with vaseline to prevent corrosion.

Attached to the back of the radio are a number of colored wires. Connect the end of the **red** wire to the binding post at the corner of the storage "A" battery marked "+" or "Positive." Connect the **black** wire to the binding post at the corner of the battery marked "−" or "Negative."

Now turn the small knob marked "Volume" to the left as far as it will go and turn the switch to the "On" position. Look down on top of the tubes and if the "A" battery is properly connected you will see a very dim glow inside the tubes. Sometimes it is necessary to shade the tubes with your hand in order to see this dim glow.

The brilliancy of the tubes is not controlled by the "Volume" knob and they will burn as long as the switch is in the "On" position. Always turn the switch to the "Off" position when you have finished using your radio set. Now remove the tubes from the sockets and do not replace them until you have the "B" and "C" batteries properly connected.

Now Connect the "B" and "C" Batteries

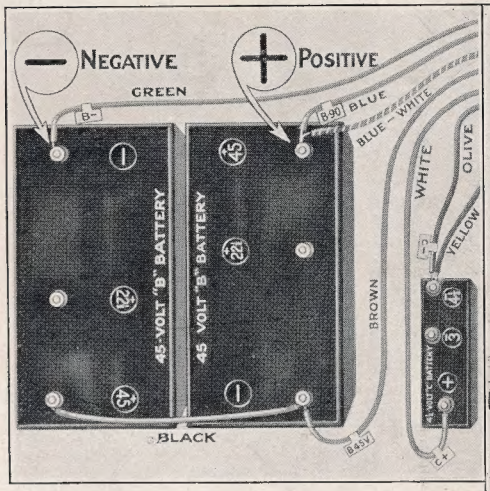


Fig. 10—Connect the wires for your "B" and "C" batteries just as shown in this illustration.

The blue and blue-white wire for the "B" battery, and the olive and yellow wire for the "C" battery (See Fig. 10), are purposely soldered together. **Do not pull these wires apart,** unless as explained on Page 13 for power tubes.

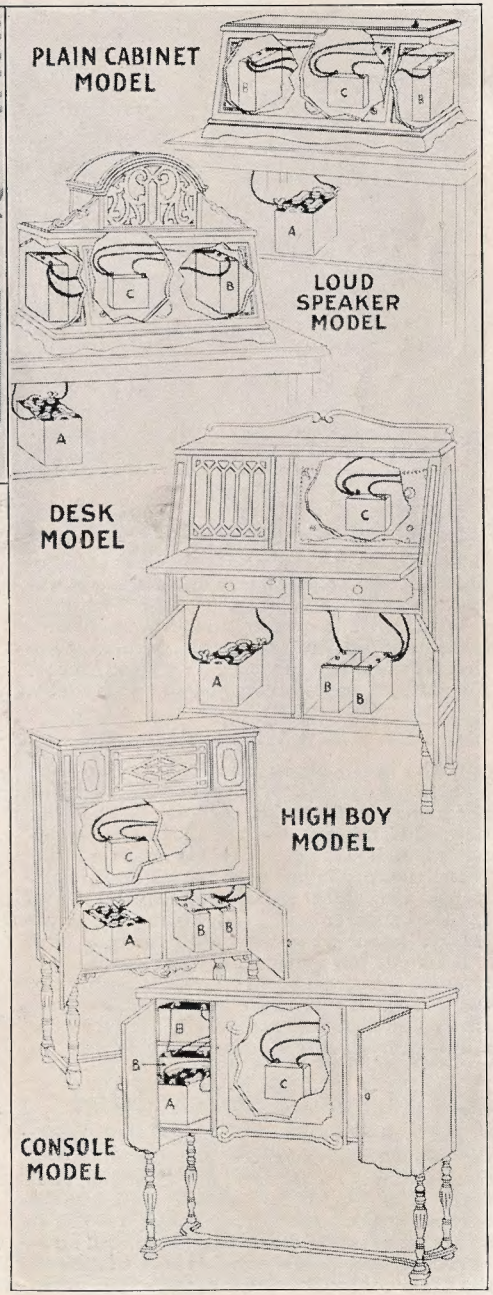
Place the two 45-volt "B" batteries in position as shown in the pictures at the right.

Now straighten out the green, blue and blue-white, brown, olive and yellow, and white wires so their ends do not touch each other or any part of the radio set sub-panel. Never allow the ends of the red, black, olive and yellow, and white wires to touch the "B" battery terminals.

Put the small 4½-volt "C" battery inside the cabinet as shown in the picture. Connect the short **olive and yellow** wires to the binding post marked "−4½." Connect the short **white** wire to the binding post marked "+." Never allow the terminals of the "C" battery to touch any of the sub-panel metal parts.

Cut off a short piece of the black antenna wire furnished, and connect the terminal marked "−" of one "B" battery to the "+45" terminal of the other "B" battery. Connect the **green** wire to the terminal marked "−" of this second battery. Connect the **blue and blue-white** wire to the terminal marked "+45" of the first battery. Connect the **brown** wire to the terminal marked "−" on this battery to which you have connected the black wire.

Now replace the vacuum tubes in the proper sockets. When replacing batteries always remove the tubes before disconnecting the wires. Do not replace until the new batteries are properly connected.



How to Connect the Loud Speaker

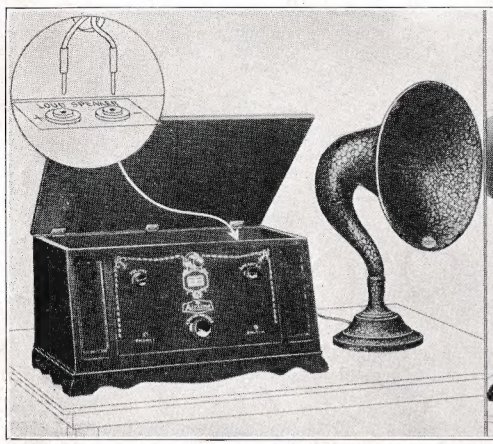


Fig. 11—Run the loud speaker cord back of the radio set and connect the metal tips to the openings on the sub-panel inside the set at the back.

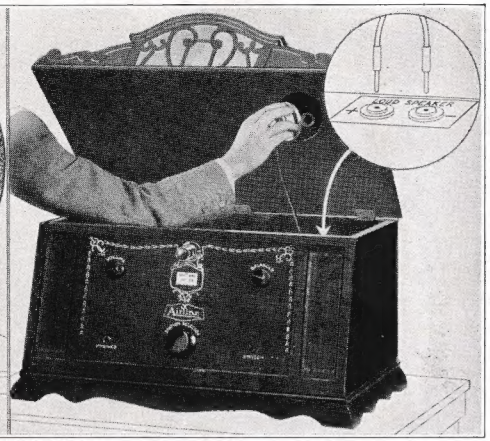


Fig. 12—Screw the loud speaker unit to the horn, run the cord along the back of the set and connect the metal tips to the openings on the sub-panel.

The Baldwin Concert Unit

The Baldwin Concert Unit is adjusted for finest tone and greatest volume. It is **not adjustable** and should not be tampered with.

With any loud speaker, you will obtain much better tone quality if the unit is operated at less than its maximum capacity. When you "force" the unit, the tones become harsh and metallic.

The Plain Cabinet Model

With this model you can use any style of loud speaker you prefer. We recommend that you use a good loud speaker such as shown in our General Catalogue. Place the loud speaker beside the radio set but not on top of the cabinet. Insert the cord in one of the small holes in the back of the cabinet and insert the metal tips of the loud speaker cord firmly in the two openings on the sub-panel marked "Loud Speaker."

After you have your set in operation, tune in a musical program and reverse the position of the two metal tips to see which position gives the loudest and clearest tones. Then adjust the unit if your speaker has an adjustable unit.

The Loud Speaker Model

The loud speaker unit is packed underneath the cabinet. Unpack the unit carefully and screw it firmly into the end of the loud speaker horn. (See Fig. 12.) Pass the loud speaker cord along the back of the cabinet keeping it **as far as possible from the tubes and sub-panel of the radio set.** Attach the metal tips of the cord to the openings on the sub-panel.

The Console Model

In this model the end of the loud speaker horn is in the compartment at the right. Pull out the small drawer, attach the loud speaker unit and connect the metal tips of the loud speaker cord to the openings on the sub-panel.

The High Boy Model

In this model the end of the loud speaker horn is in the upper compartment of the cabinet at the back. Remove the back of the cabinet, attach the unit and connect the cord tips to the sub-panel as described previously.

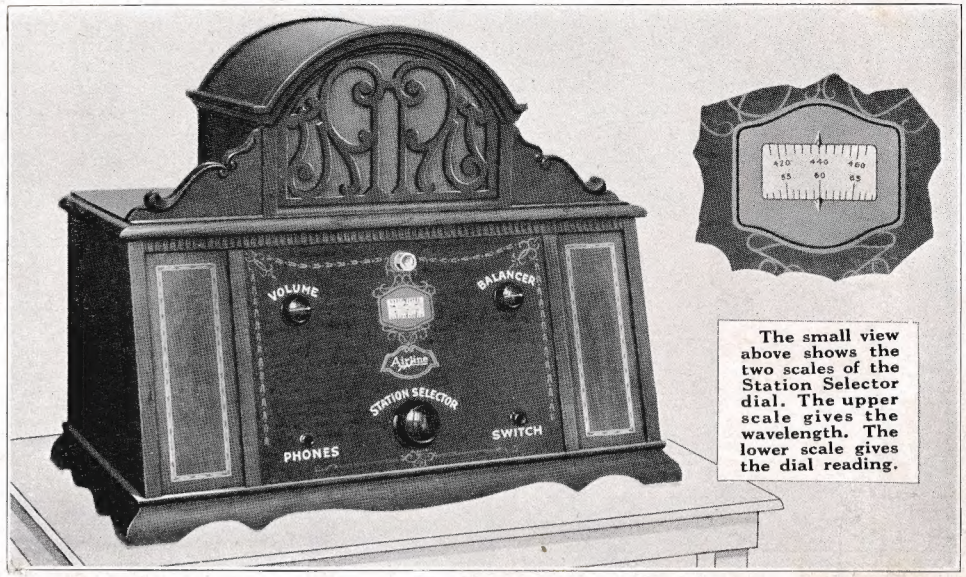
The Desk Model

In this model the end of the loud speaker horn is in the lower compartment of the cabinet at the back. To attach the loud speaker unit simply follow the directions already given.

About Using Headphones

If you wish to use headphones, order any of those listed in our General Catalogue, and at the same time, order a headphone plug. Attach the terminals of the phones to the plug. Insert the plug into the opening on the panel marked "Phones." This automatically turns out the last tube and disconnects the loud speaker. If this does not give you all the volume you need, disconnect the tips of the cord from the plug and insert them into the small openings on the sub-panel marked "Loud Speaker," in place of the terminals of the loud speaker cord.

How to Operate The Airline Radio



The small view above shows the two scales of the Station Selector dial. The upper scale gives the wavelength. The lower scale gives the dial reading.

Fig. 13—The Airline Conqueror is the easiest of all sets to tune. Do your tuning slowly and carefully. Learn to quickly adjust the tuning controls for the station you wish to hear, then adjust the set for best tone and volume

To Tune the Set

To tune your set the first time, turn the small knob marked "Volume" to the left as far as it will go and turn the switch to the "On" position. Turn the small knob marked "Balancer" so the arrow points straight up. Now turn the "Volume" knob three-quarters or more of the way to the right.

If you know from the lists in your local newspaper, the wavelength of the station you wish to hear, turn the large knob marked "Station Selector" to the right or left until the desired wavelength registers under the arrow marked "Wavelength." If the station is broadcasting and is within your range, you will hear the broadcasting or a loud whistling sound.

A loud whistling sound usually indicates the carrier wave of a broadcasting station, and if this is heard, carefully adjust the "Station Selector" knob until the whistle is the loudest. Then turn the "Volume" knob to the left until the broadcasting is plainly heard. A very slight adjustment of this knob has a marked effect upon the tone quality of the broadcast program being received.

To Adjust Tone and Volume

As soon as you succeed in hearing a broadcasting station, carefully adjust the "Station Selector" knob until the best tone and greatest volume is obtained. Then adjust the "Balancer" knob to the right or left until the program is the clearest and loudest. Now turn the "Volume" knob to the right or left to produce a satisfactory volume of sound.

When a broadcasting station is tuned in, turning the "Volume" knob farther to the right makes the broadcasting louder. After the set has been used some time, turning the "Volume" knob to the right increases the volume of sound up to a certain point and then decreases it as the knob is turned farther to the right. This indicates that the storage "A" battery needs recharging (See Page 13 for instructions on the care of the storage battery).

When tuning in the stations which broadcast on the higher wavelengths, you will find it necessary to turn the "Volume" knob farther to the right than is necessary when tuning in the lower wavelength stations.

Whistles which cannot be stopped by adjusting the "Volume" knob are usually caused by two or more broadcasting stations operating on the same or nearly the same wavelength. This is most apt to happen when the "Dial Reading" is below 30. So far no method has been found for eliminating this form of interference.

When you have finished using your set, always turn off the switch.

Keep a Record of the Stations You Hear

There is a lot of fun in keeping a record of the different stations you hear. It is surprising how soon you will have a long list of stations near and far. When you tune in a new station put down in the proper columns of the radio log below the call letters and location of the station, the wavelength of the station, which you can obtain from almost any newspaper or radio magazine, the dial setting of your set and a notation of the date and how the station was received. Then, whenever you want to listen to the same station you can refer to the chart and know exactly where to tune to find it if the station is broadcasting at the time.

Call Letters	City or Town	Wave-Length	Dial Setting	Date Heard	Remarks

Make Your Own Airline Log

Call Letters	City or Town	Wave-Length	Dial Setting	Date Heard	Remarks

Make Your Own Airline Log

Call Letters	City or Town	Wave-Length	Dial Setting	Date Heard	Remarks

How to Use a Power Tube

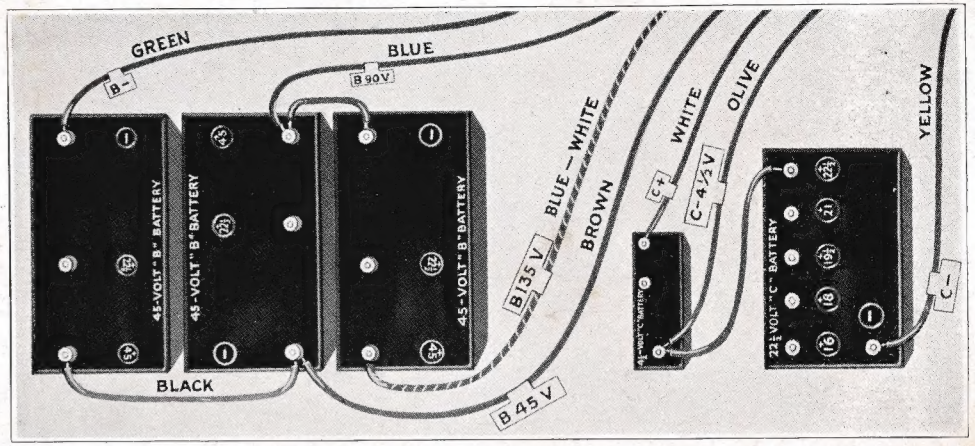


Fig. 14—This shows the proper way to connect the "B" and "C" batteries when a 171 type power tube is used. You will notice that an extra 45-volt "B" battery and 22½-volt "C" battery has been added to the usual set of batteries shown on Page 7.

For those who wish to use a power tube with their radio set these instructions will be helpful.

A power tube will use slightly more "B" battery current and consequently your "B" batteries will need replacing more frequently.

IMPORTANT: If you wish to use your set **without** a power tube, be careful not to break apart either the blue and blue-white wires or the olive and yellow wires. These wires are purposely soldered together and should never be torn apart except as explained in the following instructions for power tubes.

If you have purchased a power tube, do not put it into your set until you have installed the extra batteries as explained in the following paragraphs:

Installing the Type 171 Power Tube

In order to use a power tube an extra "C" battery and "B" battery are necessary. We recommend the use of the 171 type power tube described in our General Catalogue with the Airline Conqueror. Remove the 201A tube (the last tube to the right next to the "loud speaker" opening) from your set. Then proceed as follows:

Procure another 45-volt "B" battery and set it alongside of the present "B" batteries. Leave the green, brown and blue wires connected as you already have them. From the binding post to which the blue wire (90-volt) is attached, fasten another small piece of wire to the negative post marked "—" of the "extra" battery (See Fig. 14).

You will notice that the blue wire and the striped blue-white wire are soldered together at the ends. Pull these wires apart and put the blue wire back where it was on the second battery (the "+45" binding post). Connect the blue-white wire to the second binding post on the extra "B" battery marked "+45". (See Figure 14.) This completes the "B" battery connections.

When purchasing a "C" battery, order our catalogue number 62-5686, 22½-volt, five tap "B" battery. Leave your present "C" battery connected just as it is. You will notice that the olive and yellow wires are soldered together. Pull these apart and leave the olive wire where it was in the first place (the "4½—" binding post). Then take a small piece of wire and connect the binding post at the olive wire to the positive or the 22½-volt binding post on the new "C" battery. Then connect the yellow wire to the post marked "—" on this new "C" battery. This completes the "C" battery connections.

After you have made these connections insert the power tube at the last stage of your radio set (the last socket to the right next to the "Loud Speaker" opening). You cannot use the 201A type tube again without removing the extra batteries. The connections shown in Figure 2 are only for the 171 type power tube.

Installing the Type 112 Power Tube

For the 112 type power tube connect all the wires in the same way, except that instead of a 22½-volt "C" battery a 4½-volt "C" battery must be used. Take a small piece of wire and connect one end of it to the 4½-volt binding post of the old "C" battery. This post also has the olive wire connection. Connect the other end to the + binding post on the new battery.

How to Use a "B" Eliminator

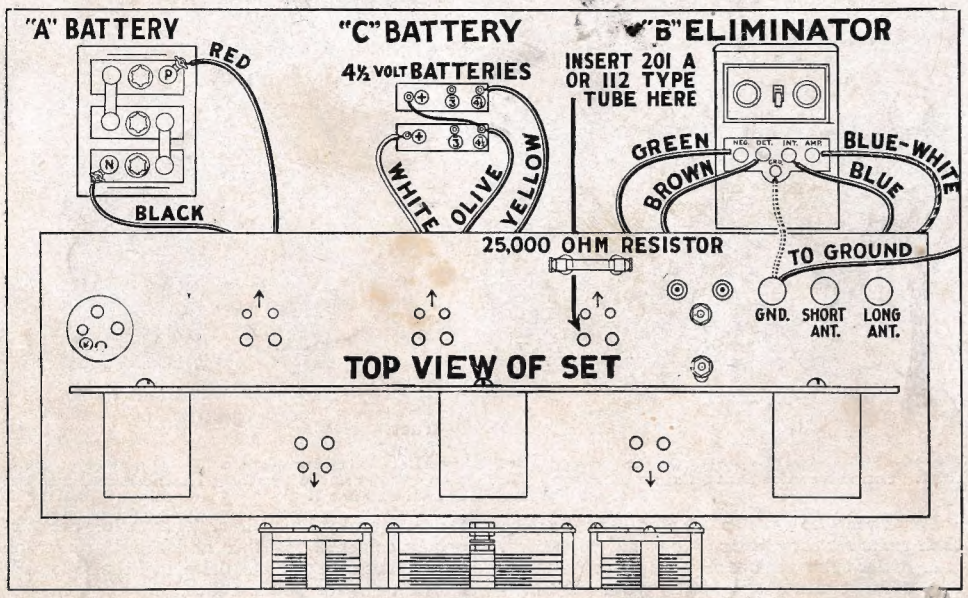


Fig. 15—This shows the connections which should be made for a "B" Eliminator that is being used with 201 A or 112 type tube. You will notice that the center wire from the "B" Eliminator to the ground binding post on your set is shown in dots. It is a good plan to try your set both with this wire in place and without it to see which gives the best results.

The Airline "B" Eliminator will take the place of the "B" batteries on your radio set. Many of our customers prefer the "B" Eliminator because after it is once adjusted, it does not require further adjusting. There is no need for recharging or replacing. The only power used is the electricity from an electric light socket.

We have carefully tested many "B" Eliminators and find most of them are noisy, do not have sufficient power, or deteriorate and wear out rapidly. Be cautious about using any "B" Eliminator other than the Airline or one equipped with a Raytheon tube.

In order to use the Airline "B" Eliminator with your set, an extra "C" battery (our catalogue number 62-5623) and a special 25,000 ohm resistor (Cat. No. 5624) are needed. No changes in the wiring are necessary.

To use an Airline "B" eliminator connect the "B" battery wires to the eliminator in this fashion: Green wire to binding post marked "NEG." Blue wire to binding post marked "INT." Brown wire to binding post marked "DET." Blue-white wire to the binding post marked "AMP."

Place the new "C" battery next to the one already in use. The white wire "C +" should be connected to a binding post marked "+". Connect the olive wire to the binding post on the same battery marked "$-4\frac{1}{2}$". Then take a short piece of wire and connect this same binding post to the other "C" battery post marked "+." Connect the yellow wire marked "C-9" to the binding post on this battery marked "$-4\frac{1}{2}$".

This completes the connection to the "C" battery and the eliminator.

Replace the solid brass cartridge (See Figure 15) with the 25,000 ohm resistor. This resistor requires no adjustment.

Between the two adjusting knobs on the eliminator there is a switch marked for high and low voltage. Place the switch in the high position. Then screw the "INTERMEDIATE" knob in as far as it will go without turning it tight. Now turn on your radio set, plug your eliminator cord into a light socket and tune in a local or loud station. If the radio set makes a fluttering noise the "DETECTOR" knob on the eliminator is turned in too far. With the set in operation unscrew the detector knob until the fluttering noise stops and the station is heard clearly. Now turn the "On and Off" switch on the radio set, on and off several times to be sure that the fluttering noise will not start again. If the set still flutters unscrew the detector knob on the eliminator a little further to the left until the noise stops. When you have the detector knob properly adjusted, turn the intermediate knob back until loudest and purest tones are received. No further adjustments are necessary.

After using the set **be sure** to disconnect the "B" Eliminator from your light socket.

The "B" Eliminator with a Power Tube

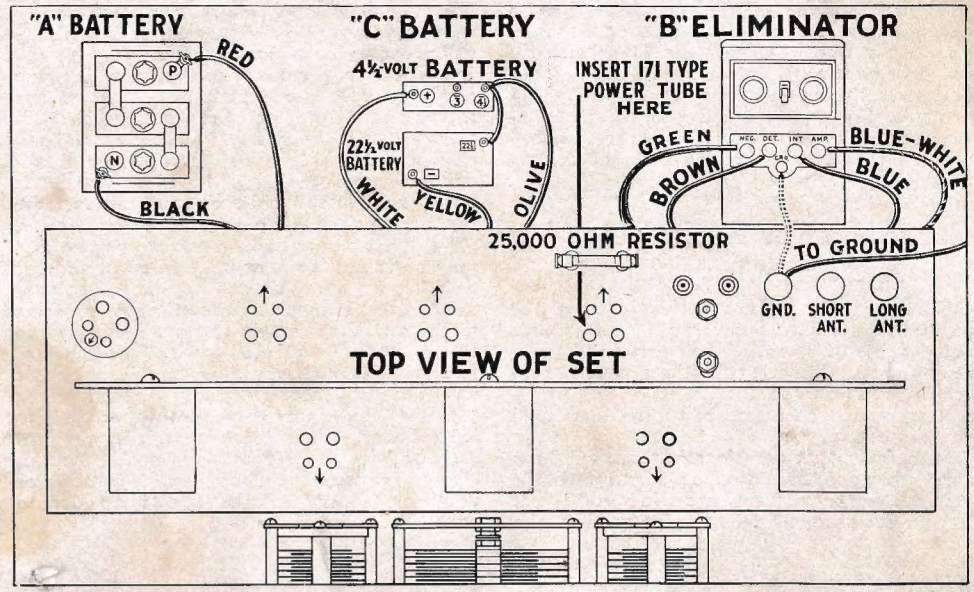


Fig. 16—In using the "B" Eliminator with the 171 type power tube you will find this illustration helpful You will notice that a 22½-volt battery has been added to your "C" battery group. A 4½-volt battery should be used instead of the 22½-volt battery with the 112 type power tube.

The instructions on this page are given so that it will be easy for you to install a "B" Eliminator with a power tube in your radio. This arrangement is especially satisfactory because the extra "B" battery current which the power tube consumes can be taken care of by the Eliminator without increasing the cost of operation.

An ordinary pair of batteries would have to be replaced at regular intervals. But the "B" Eliminator should last indefinitely. The only cost is the electricity from the light socket whether you use a power tube or not.

Your set may be used satisfactorily with two kinds of power tubes—type 112 or type 171. By experiment we have found that the type 171 gives slightly better results with your particular set. We recommend it in preference to the 112 type tube.

The connections for the "B" Eliminator are the same for all tubes.

For Type 112 Power Tube

To use this tube with your set the following additional parts will be required:

62-5106—1 Power Tube Type 112.
62-5624—1 25,000 ohm resistor.
62-5623—1 4½-volt Battery.

Make all the battery and "B" Eliminator connections just as explained on Page 14 and as shown in figure 15.

Remove the metal cartridge from the clips at the back of the sub-panel and insert the 25,000 ohm resistor (see Figure 16), in the same clips. Now place the 112 type power tube in the last socket to the right next to the loud speaker opening and your set is ready for operation.

For Type 171 Power Tube

To use this tube with your radio set the following extra parts will be needed:

62-5094—1 Power Tube Type 171.
62-5624—1 25,000 ohm Resistor.
62-5685—1 22½-volt Battery.

Make all the battery and "B" Eliminator connections as explained on Page 14. You will find it a help to follow Figure 16 at the top of this page.

Remove the metal cartridge from the clips at the back of the sub-panel and insert the 25,000 ohm resistor in the same clips. Place the 171 Type tube in the last socket to the right next to the loud speaker opening and your set is ready for operation.

What to Expect From Your Airline Radio

The success you will have with your radio depends to a certain extent upon your understanding of what it will do and what it should not be expected to do. You will always get better results as you learn to adjust the tuning controls. Sometimes a **very slight adjustment** of one or two knobs makes a great difference in the clearness and volume of the reception.

Conditions for Radio Reception Are Not Always Good

There are so many things that influence the results obtained from any radio set that it is not possible to guarantee any certain distance at any time. Climatic conditions, general geographic location and the power of the broadcasting station all influence the results which you can obtain.

Remember that occasionally there will be a night when good reception is almost impossible even during the winter when radio is at its best. If your set suddenly fails to give good results do not be alarmed or think something is wrong, wait and try again the next night and results will probably be as good as ever.

There is one curious condition which you may encounter known as "Fading" and this is rather confusing if you are not familiar with radio sets. You may tune in a station loud and clear and suddenly the music or speech gradually becomes weaker and weaker until it is barely audible and will then gradually increase in strength until it is once more loud and clear. All this may happen in a minute or two and may occur only once or twice in an evening or may happen many times.

"Fading" is much more noticeable on some nights and with certain stations and all radio sets are equally affected by it. The cause of "Fading" is not clearly known and it may occur when you are listening to any station. When "Fading" does occur the only thing to do is to leave the set just as it is and wait for the program to become clear and loud again. Do not change the position of the tuning controls or the "Volume" or "Balance" knob in an effort to prevent "Fading."

The Care of Your Airline Radio

If the instructions in this book are carefully followed, your Airline Radio will operate to your entire satisfaction and furnish you and your family with splendid radio programs. The only care which your set will need is the recharging of your storage "A" battery from time to time, the replacement of the "B" and "C" batteries as the old ones wear out, and the infrequent replacement of the vacuum tubes.

The Life of Your Batteries

The "B" batteries will last from 3 to 6 months depending upon how much the set is used. When you think they are wearing out, test them with a reliable voltmeter made specially for the purpose. Test the "B" batteries after the set has been in use for several hours and if the reading of either battery is 32 volts or less, the batteries should be replaced. If allowed to rest over night, "B" batteries regain part of their power but quickly drop to the lower voltage when the set is used. Never connect a new battery and a partially worn out battery together.

When testing your "B" batteries, never keep the voltmeter connected to the batteries for more than a few seconds or just long enough to obtain a reading. When necessary to order new batteries, refer to our General Catalogue and order "B" battery, Number 62—5690.

The "C" battery should be replaced about every four to six months. Refer to our General Catalogue and order "C" battery Number 62—5623.

Full instructions for the care of the storage "A" battery are given on the next page.

If Repairs Are Needed

If you feel that your radio set requires any repairs, please write us for shipping instructions before you send it back. Tell us any difficulty you have had and just what you did to try to make the set work. We can often suggest some simple adjustment which you can make yourself. If we do not succeed in helping you get good results, and you have to send the set to us for repairs, please pack and send it to us according to the instructions we furnish.

Disconnect the batteries and remove the wires from them. Do not return the batteries unless we especially request you to do so. Repack the tubes in the boxes in which they originally came or in a box large enough so plenty of cotton or similar material can be packed around each tube. Select a box large enough to hold the cabinet and the tubes. Put them in and pack them securely using newspaper or excelsior to prevent shifting about. Address the box and ship it to us as we will indicate in our letter to you.

When writing us, always mention the complete catalogue number of your set.

Keep Your Storage "A" Battery Fully Charged

With proper care, this storage battery will give excellent service for years. It is very important to give it the little attention it needs.

Do not let dust or dirt accumulate on the battery. Wipe the top with a dry cloth or with a cloth dampened with ammonia water. There is no danger of receiving an electric shock.

Do not "short-circuit" the battery.

The Liquid in the Battery

The liquid in this battery is a mixture of sulphuric acid and distilled water. If spilled on the carpet, rugs or clothes it will burn them beyond repair.

The liquid in each cell should always come at least ½ inch above the top of the vertical plates inside the case. Unscrew the filler or vent cap of each cell to check the height of the liquid. If more liquid is needed, **add only distilled water** which can be purchased from any garage or drug store. Fresh rain water, if caught in the open in a clean glass or earthenware dish is also suitable. Do not use water out of the cistern or where it runs off the roof. Never put well or hydrant water in your battery.

Use the hydrometer or a glass funnel when adding water to the battery. Never attempt to add acid—distilled water is all that is needed. Never allow the flame of a match or other open flame to come near the vent holes of the battery particularly when it is being charged.

When to Charge Your Battery

Your battery was fully charged before it was shipped to you, but a new battery always needs recharging more often than a battery which has been used some time. **At first, it will probably need recharging after two or three days' use.** After that the charging periods will gradually come farther apart until a charging every two weeks will be sufficient.

It is better to charge a battery too often than not often enough. Your battery will need charging whether it is in use or not and should always be kept fully charged. Under-charging and neglect have ruined more batteries than any other causes. After two or three chargings, the battery should give an average of 40 hours' use with a five or six tube radio set.

How to Test Your Battery

Each cell of your battery should be tested separately. Unscrew each filler, or vent cap and, with the hydrometer, draw up sufficient liquid from the cell to float the scale inside the tube. When the scale is floating, the point where the liquid crosses the scale gives the reading of the hydrometer. When the scale reading is 1200 or lower, the battery needs charging. Replace the liquid in each cell as soon as you have obtained the reading and be very careful not to allow any of the liquid to drip on the floor or your clothes.

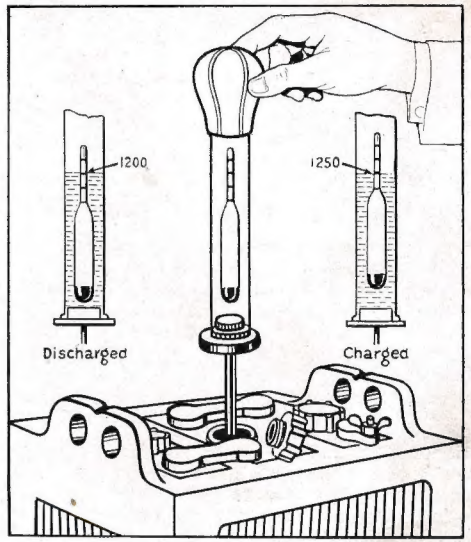


Fig. 14—Draw up the liquid from each cell separately until the scale floats in the tube of the hydrometer.

When the battery is fully charged, the scale reading of the hydrometer will be 1250 or a little more. Do not attempt to take a hydrometer reading immediately after adding distilled water to the battery.

How to Charge Your Battery

With a good charger, you can charge your battery at home for a cost of about 5 to 10 cents if you have alternating current of 110 volts at 60 cycles or a 32-volt farm plant. Always disconnect the wires leading from the storage battery to the radio set while charging the battery and leave them disconnected as long as the charger is being used.

Loosen the vent caps on the battery cells and connect the charger according to the instructions furnished. Allow the battery to charge until the hydrometer test shows that it is fully charged. This will take from 12 to 48 hours, depending upon the condition of the battery and the type of charger used. When the battery is fully charged, disconnect the charger and connect the wires leading to the radio set. If your battery has stood idle for some time in a discharged condition, **it will probably take twice the usual length of time to charge it fully.**

It is a good plan to charge your battery at night so it will quiet down before the radio set is used the next time.

What to Do in Case of Trouble

Radio sets are so well perfected that almost anyone can find the little things which sometimes cause trouble, and fix them in a few moments. There is nothing at all mysterious about a radio set. If everything is all right **it simply must operate** (provided weather conditions are right). You will find here a list of the things which might possibly (but probably never will) happen to your set. If you have trouble, check your set with this "trouble chart."

When Tubes Do Not Light

If the tubes do not light up dimly when you have the switch turned on, the trouble may be due to a loose connection at the storage battery or the battery may need recharging. Tighten the connections carefully and see that the ends of the wires and the battery terminals are clean. Also, be sure that the tubes are pushed firmly down into the sockets.

Tubes Light But Set Is Silent

If the tubes light up dimly and you hear the click as you turn the switch to the "On" position, but you are still unable to hear any broadcasting when you tune the set, the trouble may be due to a broken antenna or ground wire, to a loose or poor connection in the antenna or ground wire, or you may have connected the ground wire to some object which does not make good contact with moist earth. Read over the instructions again telling how to connect the antenna and ground. Perhaps you are too impatient and have not yet learned to properly tune your set.

Reception Is Not Always Good

If your set has been in operation and you have been hearing broadcast programs, but you are no longer able to do so, test your storage battery and the "B" batteries as explained elsewhere in this book. Remember that radio reception is better at night than in the daytime and is better in the winter than in the summer. Sometimes for days, or even weeks, radio reception may be very poor and uncertain. This condition existed for many weeks in the early spring of 1926. Also there may be times when broadcasting stations in one part of the country will be heard plainly while other stations equally powerful but in a different locality, can be heard only faintly or not at all. It is generally easier to hear a powerful station 500 miles away than a smaller station only 50 miles away. Try tuning in different stations and be sure that you have the Volume control adjusted far enough to the right. Tune the set slowly and carefully and listen for any squeals or whistling noises. As soon as a whistle is heard, adjust the tuning controls carefully and then adjust the Volume control to the left until the broadcast program becomes clear and distinct.

No Click Is Heard When Switch Is Turned On

If no click is heard as the switch is turned to the "On" position, be sure that the tubes light up dimly. Refer to the illustration which shows how the "B" and "C" batteries should be connected and be sure that you have the wires connected exactly as shown in the picture. Be sure the tubes are firmly held in the sockets. Be sure that the ends of the wires are clean and that they are firmly held by the spring clips and binding post nuts. Examine the metal tips on the loud speaker cord and be sure that they are pushed down securely into the openings marked "Phones or Loud Speaker."

Music Is Not Distinct

If the set is being tried out for the first time, you may not have learned how to tune it properly or you may be testing it during the daytime when reception is poorest. Wait until night when reception is best and then tune carefully according to the instructions. Be sure that the red wire is connected to the positive post of the storage Battery. Be sure you have the Volume control adjusted far enough to the right. Try reversing the position of the metal tips of the loud speaker cord where they are connected to the radio set. If your set has been in use for some time trouble may be due to run down storage battery or worn out "B" batteries. Test the batteries as explained elsewhere in this book.

Although every tube is tested before it leaves Montgomery Ward & Co., tubes are sometimes affected by rough handling during shipment. If you do not get perfect results from your set, tune in some musical program and try changing the tubes in different sockets until you find which combination gives the best results. Each time you make a change, it is well to readjust the Volume control. If at any time you need new tubes, refer to our General Catalogue and order 62—5099 or 62—5086 or 62—5085.

Write us in case of trouble

What to Do in Case of Trouble

First:—Make sure, by testing, that all your batteries are sufficiently charged, particularly your storage "A" battery.

Whistling Noises

When reception is not clear it usually indicates that either the Volume control is improperly adjusted or turned too far to the right. A continuous whistling sound at certain places on the tuning controls is sometimes caused by two or more broadcasting stations within your range operating on the same or almost the same wavelength. This condition is more apt to exist on the lower wavelengths because of the greater number of broadcasting stations which operate below the 300 meter wavelength. This condition can not be overcome by any radio set.

Loud rising and falling whistling noises are also caused by improperly constructed or improperly operated regenerative receiving sets being used in your neighborhood. When the operator of the offending set changes his tuning the whistle will be tuned in at a different point on your radio set. Unfortunately there is no remedy for this condition until every owner of a regenerative set learns to tune his set properly.

A continuous whistle may be caused by having the loud speaker cord **too near** the tubes or the sub-panel of your set. **Keep this cord as far to the back of the set as possible.**

Harsh Noises

Harsh noises in a radio set usually fall into three general classes—noises caused by so-called "static," by loose connections in your ground, antenna or battery wires, and by weak or run down batteries.

"Static" noises are clicking, scratching or crackling noises at frequent intervals and are usually present more during the summer months than during winter. During hot weather, before and during electrical storms, static noises are much worse than at other times. To test if the noise is caused by static or something outside your set, disconnect the antenna wire from set.

If the noise stops when you disconnect the antenna, you can be fairly sure that the trouble is not due to any defect in your set but is probably caused by "static" which can not be controlled. However, the trouble might be caused by loose or poor connections in the antenna or ground wire. A continual buzz may be caused by having the antenna too close to electric power or light wires.

If the troublesome noises continue after you have disconnected the antenna wire from the set, it shows that the noise is caused by some defect in the set or the connections. Be sure that the battery wires are all tightly connected and that the tubes are firmly set in the sockets. Sometimes interchanging the tubes in the sockets will eliminate noises in the set. A defective cord on the loud speaker may also cause such noises.

Write us in case of trouble

Music Is Not Loud Enough

If you can hear a station clearly but faintly, you may be listening to a station that is almost out of your range or you may have tuned-in the station when it was "fading" as mentioned elsewhere in this book. Wait a few minutes to see if the station will come in with better volume. Try adjusting the Volume control farther to the right. Try reversing the position of the metal tips of the loud speaker cord where they are attached to the set. Test your storage battery to see if it needs recharging. If your set has been in use for some time, your "B" batteries may be wearing out and need replacement.

Selectivity

Your Airline radio is adjusted for selectivity so that it will give the most satisfactory results in almost all parts of the country. But in some sections of the country where local stations are extremely powerful you may have difficulty in tuning them out. If you experience any of this trouble, write us and our Radio Service Department will tell you how to eliminate such a station.

Testing the "B" Batteries

The only accurate and satisfactory way of testing your "B" batteries is with a voltmeter reading from 0 to 50 volts. Do not attempt to test your "B" batteries with anything but a voltmeter made specially for this purpose such as listed in our large General Catalogue.

Test your "B" batteries only when you think your batteries are worn out and do not keep the voltmeter connected for more than a few seconds or just long enough to obtain an accurate reading of the voltage of the battery.

When the reading of a 45-volt "B" battery after several hours' use, is 32 volts or less, the battery is worn out and should be replaced. Batteries will recuperate somewhat when allowed to stand overnight or for several days.

If you have no voltmeter you can estimate their condition in the following way: If your "B" batteries have been in use for some time and you find it necessary to turn the Volume control farther and farther to the right in order to get the usual volume from your set, and you know that the storage "A" battery is fully charged, it usually indicates that your "B" batteries are wearing out and should be replaced.

Questions and Answers

Question:—Do the "B" batteries wear out quickly with the Airline Sets?

Answer:—No. This set uses only about half the "B" battery current of the average **five tube** set. For this reason, your "B" batteries will last much longer than with similar sets.

Question:—Can I use accessories such as tubes and batteries other than Airline?

Answer:—Yes, provided you use only the best. We caution you against using old batteries or tubes that are of doubtful quality or that have been partly worn out.

Question:—Can I improve my Airline Set by making changes?

Answer:—No. Your set is designed by experts to give the very best results. Any change you make will surely harm your reception.

Question:—Can I use a loop antenna with my Airline Set?

Answer:—No. Airline Sets are not designed for use with a loop antenna. However, an inside antenna can be used but it is not recommended for long distance reception nor will it give the volume of a good outside antenna.

Question:—Can I use an "A" and "B" battery eliminator with my Airline Set?

Answer:—Up to the present time we have not found an "A" battery eliminator that would operate satisfactorily with any type of radio set. For the best reception and service, we recommend a regular storage battery and a trickle charger to take the place of an "A" battery eliminator.

We recommend only the Raytheon type "B" eliminator such as is listed in our catalog. The instructions for this eliminator will be found on Page 14 of this book.

Question:—Why do you furnish a "C" battery with the Airline Set?

Answer:—The "C" battery is furnished to prolong the life of your "B" batteries and tubes and to improve the tone quality of your reception.

Question:—Why do you furnish Airline Tubes with the Airline Set?

Answer:—The development of Airline Tubes is the result of our own experiments and tests. They embody features found in no other tubes—see the detailed description in our General Catalogue. Good results from your Airline Set can only be obtained by using good tubes. Do not be misled by the low prices of so-called independent tubes as most of them are second grade tubes of inferior quality.

Question:—Are built-in loud speakers as good as the separate speakers?

Answer:—Yes. Our Airline built-in speakers are constructed and equipped to give results equal to any outside speaker. They are full-floating and are mounted on sponge rubber to eliminate vibrations and so-called microphonic noises in the radio set.

Question:—What loud speaker do you recommend for use with the Airline Set?

Answer:—A radio set is only as good as the loud speaker. We have experimented with all known makes of horns and units and have found the Nathaniel Baldwin Unit to be far superior to all others in tone quality and volume.

Question:—Do you recommend the use of cone type loud speakers?

Answer:—Up to date we have not found a cone type speaker that gives the perfect tone quality and volume of the Baldwin Unit.

Question:—If a tube lights, does it indicate that it is a good tube?

Answer:—No. The fact that a tube lights is not a sure sign that it is in good condition.

Question:—How can I test my tubes to be sure that they are good?

Answer:—We have a dependable tube tester listed in our General Catalogue. Also, you can buy one extra tube and test your tubes by replacing the tubes in your set, one at a time, with the extra tube to see if it will improve the reception of your set.

Question:—Is it possible to obtain satisfactory reception in the summer?

Answer:—Summer reception is never as good as winter reception and daylight reception is not as good as at night. Do not become discouraged if your set does not operate efficiently at all times in the summer. You will get as good reception with your Airline Set as can be had with any radio set.

Question:—If I should desire to return my radio can I keep any or all of the accessories such as tubes, batteries, etc.?

Answer:—Yes. We realize that although you may wish to return your radio you probably will want to keep some of the accessories for your next set. So you are permitted to keep these accessories and the amount will be deducted from your returned money.

Write us in case of trouble

If You Have Any Difficulty

This Airline Radio has been thoroughly tested in three different localities by our experienced radio men. Every precaution has been taken to have this set reach you in good working condition.

If, you find however, that your Airline does not operate as well as your neighbor's radio set, read again the information contained in this book, making sure that you have followed instructions. It is a good plan to try your tubes in a neighbor's set to see if they are all right; sometimes they are injured in shipment.

Local Repairs

Ordinarily, you will be able to locate the difficulty easily. But if you cannot locate the trouble and the set does not operate the way you think it should, we suggest that you call in some reliable person who has had radio experience. If he finds a repair is necessary which will cost more than a small amount, write us for authority to have such a repair made at our expense. In case the person you call in, is unable to locate the trouble, write us in detail, telling just how the radio operates and our Radio Service Department will tell you how to correct it.

Give the Set a Fair Trial

Do not expect the impossible from this set. Some stations are so close in wave length that no radio can separate them. On some nights atmospheric conditions are so bad that good reception is impossible with any radio.

Do not return your radio because of some minor difficulty. We know positively that this set is as good a radio as you can buy anywhere. Thousands of our customers in every section of the country are using Airline sets with success. If at first you experience difficulty, be patient, try to find the trouble. If you cannot, write us about it before the end of the 30-day period. After you become acquainted with the set, you will be rewarded in the many pleasures you will receive from your Airline in the years to come.

INVITE YOUR NEIGHBORS TO HEAR YOUR AIRLINE